AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method for correcting spherical aberration in an electron beam having an upstream region and a downstream region, said method comprising:

producing an electron beam;

removing ions from the electron beam using electrical fields in the upstream region of the electron beam;

allowing ions to accumulate in the downstream region of the electron beam using an ion trap and a grounded tube; and

adjusting a range of spherical aberration correction of the ion trap with the grounded tube,

wherein the grounded tube is positioned downstream from the ion trap and centered symmetrically around an axis along which the electron beam travels and wherein a distance between the grounded tube and the ion trap prevents arcing between the grounded tube and the ion trap.

2. (Original) The method of claim 1, further comprising adjusting an aperture in the ion trap to adjust the range of spherical aberration correction of the ion trap.

3. (Original) The method of claim 1, further comprising applying a voltage to the ion trap to form a neutralization boundary to trap the ions accumulated in the downstream region of the electron beam.

4. (Original) The method of claim 3, wherein the voltage applied to the ion trap to form the neutralization boundary decreases as a radius of the grounded tube decreases.

5. (Original) The method of claim 1, wherein the ion trap comprises a positive ion electrode.

6. (Original) The method of claim 1, wherein the electrical fields are generated by an ion clearing electrode.

7. (Currently Amended) A computed tomography system, said system comprising:

an electron beam source for generating an electron beam;

an ion clearing electrode for removing ions from said electron beam using electrical fields;

an ion trap for allowing ions to accumulate in a downstream region of said electron beam so that said ions do not drift upstream;

a beam tube for housing said ion trap; and

a grounded tube, located downstream of said ion trap, said grounded tube being electrically grounded, an effective electrical radius of said beam tube conforming to a physical radius of said grounded tube to reduce spherical aberration in said electron beam,

wherein said grounded tube is centered symmetrically around an axis along which said electron beam travels and wherein a distance between said grounded tube and said ion trap prevents arcing between said grounded tube and said ion trap.

8. (Original) The system of claim 7, wherein said grounded tube comprises a non-magnetic grounded tube.

9. (Original) The system of claim 7, wherein a radius of said grounded tube extends a lower limit of spherical aberration correction of said ion trap.

10. (Original) The system of claim 7, wherein said ion trap comprises a positive ion electrode, said positive ion electrode including an aperture through which said electron beam passes.

11. (Original) The system of claim 10, wherein size of said aperture is adjusted to adjust an upper limit of spherical aberration correction of said ion trap.

12. (Original) The system of claim 7, wherein said ion trap uses a voltage to create a neutralization boundary to trap ions in said downstream region of said electron beam.

13. (Original) The system of claim 12, wherein said grounded tube decreases said voltage applied to said ion trap for a certain spherical aberration correction.

14. (Original) The system of claim 7, further comprising beam optics to at least one of aim and focus said electron beam.

15. (Original) The system of claim 7, further comprising a target producing x-ray radiation in response to impact by said electron beam.

16. (Original) The system of claim 15, further comprising a detector for detecting said x-ray radiation produced at said target.

17. (Currently Amended) A method for reducing spherical aberration in a computed tomography scanner, said method comprising:

increasing an upper limit of spherical aberration correction by widening an aperture of an ion trap, the ion trap allowing ions to accumulate in an electron beam at a downstream portion of the electron beam using an applied potential;

extending a lower limit of spherical aberration correction by positioning a grounded tube beyond the ion trap, wherein the lower limit of spherical aberration correction is extended in proportion to the position of the grounded tube and a radius of the grounded tube; and

passing an electron beam through the ion trap and the grounded tube.

18. (Original) The method of claim 17, wherein the grounded tube decreases the applied potential for spherical aberration correction.

19. (Currently Amended) A system for correcting spherical aberration in an electron beam, said system comprising:

an ion trap having a voltage for applying a potential to an electron beam to allow ions to accumulate in said electron beam in a portion of said electron beam downstream from said ion trap in order to reduce spherical aberration in said electron beam; and

a grounded tube for extending a range of spherical aberration reduction in relation to at least one of dimension and position of said grounded tube, said grounded tube reducing said voltage applied to said ion trap, wherein the range of spherical aberration correction is extended in proportion to the position of the grounded tube and a radius of the grounded tube.

20. (Original) The system of claim 19, wherein said voltage applied to said ion trap decreases as a radius of said grounded tube decreases.

21. (Original) The system of claim 19, wherein said range of spherical aberration reduction expands as size of an opening in said ion trap expands.